A cross-sectional evaluation of motivations for nicotine pouch use among rural Appalachian adults

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ABSTRACT

INTRODUCTION Rural Appalachia has among the highest tobacco use rates in the United States, yet little is known about why residents use nicotine pouches (NPs), tobacco-free oral nicotine products. The study aimed to characterize NP use motivations among rural Appalachian adults and compare motive endorsement between current and former users.

METHODS From October 2025 to March 2026, adults (aged ≥18 years) reporting ever NP use were recruited through seven community pharmacies and a federally qualified health center in rural Virginia, Kentucky, and West Virginia to complete an anonymous cross-sectional survey. Thirteen motives across harm-reduction, product-attribute, practical, and social/normative domains were compared between current and former users using chi-squared tests or Fisher's exact tests.

RESULTS Of 106 lifetime NP users, 76 (71.7%) were current, and 30 (28.3%) were former. The most endorsed motives were convenience in smoke-free spaces (86%), preferred flavors (78%), acceptability to non-users (70%), and lower perceived harm to others (70%); advertisements and media/public figure motives were lowest. Two harm-reduction motives differed significantly by use status: lower perceived harm to others (76% current vs 55% former; p=0.042) and using NPs to quit other products (74% vs 41%; p=0.002). Other harm-reduction and product-related motives were higher among current users but nonsignificant.

CONCLUSIONS NP use was motivated primarily by convenience, flavors, discretion, and harm-reduction beliefs. Two harm-reduction motives, lower perceived harm to others and using NPs to quit other products, distinguished current from former NP users, suggesting these beliefs may sustain use where tobacco burden is high and cessation access limited.

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smokeless tobacco, tobacco harm reduction, rural health, nicotine pouches, Appalachia

INTRODUCTION

Rural Appalachia has long borne a disproportionate burden of tobacco use relative to the rest of the United States (US), with some of the highest rates of tobacco-related disease and smokeless tobacco use in the country[1,2]. In West Virginia, approximately 8% of adults use smokeless tobacco – roughly two to four times the national average and the highest rate in the nation[3]. This burden is reflected in elevated rates of oral and head and neck cancers and cardiovas-

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cular disease, compounded by the region's long-standing status as a medically underserved and under-researched population[2,4].

Nicotine pouches (NPs), the newest nicotine product to reach the mass market, follow a familiar pattern of use in the US, with use concentrated among males and individuals who use smokeless tobacco products, a profile that closely mirrors rural Appalachia[5]. NPs are tobacco-free oral sachets placed between the gum and lip; leading brands include ZYN, VELO, On!, and Rogue, with ZYN dominating US sales[6,7]. Sales increased on average 8.1% each month between 2019 and 2022[7], and by 2024 monthly sales exceeded one billion units[8]. Nationally, NP users frequently report concurrent use of other tobacco products, raising concern that these products may perpetuate sustained nicotine use[5,6]. Among US youth, NPs are now the second most commonly used tobacco product, behind only e-cigarettes[9]. Although use is suspected to be growing rapidly in rural Appalachia, prevalence in the region remains unknown. Research on why people use NPs has only recently emerged. Commonly reported motives include curiosity about the nicotine 'buzz', convenience and discretion of use, harm-reduction beliefs, appealing flavors, and use as a cessation aid[10,11]. To date, there is little research that has examined motivations for NP use specifically in rural Appalachia. In a region where smokeless tobacco use is deeply entrenched[12], harm-reduction beliefs may be especially salient[12-15]. Given the region's limited access to cessation services, understanding what sustains use is essential for designing targeted and efficient interventions[1,2].

This study aimed to characterize motivation for NP use among rural Appalachian adults recruited through community pharmacies and a federally qualified health center (FQHC). We hypothesized that harm-reduction beliefs and product attributes would be more strongly endorsed by current than former users, suggesting these motives sustain rather than merely initiate use.

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METHODS

Participants

Individuals were recruited from October 2025 to March 2026 to complete a brief, anonymous cross-sectional survey assessing NP use and motivations. A convenience sample was recruited through seven independent community pharmacies and a Federally Qualified Health Center (FQHC) located in rural Appalachian areas of Virginia, Kentucky, and West Virginia. Pharmacies and the FQHC displayed study flyers, spoke with patients, and sent a text message to all patients providing information about the study and how to participate. Eligible participants were at least aged 18 years, lived in rural Appalachia [defined by Rural-Urban Commuting Area (RUCA) code of 4–10, or areas classified as non-metropolitan/rural][16,17], could read and understand English, and reported ever using nicotine pouches. The study received a waiver of consent from the coordinating academic institution's Social and Behavioral Sciences Institutional Review Board. All participants read a study overview and affirmed their willingness to participate before beginning the survey, and all had the option to enter a raffle to win one of five $100 gift cards.

Measures

The survey assessed lifetime NP use (have you ever used the product in your lifetime [even just once]), current NP use (use in the past 30 days), and 13 theoretically grounded use motives[18-21]. Motivations were assessed with 13 items introduced by the stem 'I use/used nicotine pouches because …' each with response options of 'yes', 'no', 'don't know', or 'refuse to answer'. The motives spanned four conceptual domains: harm reduction (less harmful to me, less harmful to others, helps quit other products), product attributes (available in preferred flavors, no smell, stronger sensations), practical/situational (convenient in smoke-free spaces, affordable), and social/normative (acceptable to non-users, discreet use, use by important others, advertising appeal, and media- or public-figure use).

Statistical analysis

Descriptive statistics (frequencies and proportions) were calculated for each motive among the full analytic sample. Endorsement was coded as 'yes' versus all other responses ('no', 'don't know', 'refuse to answer'); percentages use all respondents who answered the item. Endorsement of each motive was compared between current and former users using chi-squared tests; Fisher's exact test was used when expected cell counts were <5. In Table 1, motives of NP use were ordered by prevalence of endorsement among current users. Given the exploratory nature of the analyses, a two-tailed threshold of $p<0.05$ was used without adjustment for multiple comparisons. Missing data were handled by complete-case analysis for each motive, with the valid denominator reported per item. Analyses were conducted in R and Stata 19.

RESULTS

Of the 202 respondents, 106 met eligibility criteria and comprised the analytic sample; 76 reported current use (71.7%), and 30 (28.3%) reported former use. The most endorsed motives were practical and product-related (Supplementary file Table 1). Table 1 compares motive endorsement between current and former users. Two motives, both in the harm-reduction domain, differed significantly by use status: lower perceived harm to others, endorsed by 76% of current versus 55% of former users ($p=0.042$), and using NPs to help quit other products, endorsed by 74% of current users versus 41% of former users ($p=0.002$).

DISCUSSION

Our study characterized motivations for NP use among adults in rural Appalachia, a region that bears one of the nation's highest tobacco burdens[1,3]. Among rural Appalachian adults, NP use appears to be motivated chiefly by convenience, flavors, discretion, and harm-reduction beliefs, with harm-reduction beliefs (namely perceiving pouches as less harmful to others and as a quitting aid) most clearly associated with current use.

The high overall endorsement of harm-reduction motives, specifically lower perceived harm to self and to others, aligns with how NPs are marketed and perceived as reduced-risk, 'tobacco-free' alternatives[6,11]. Yet the long-term health effects of NPs remain unknown, and in a region where smokeless tobacco use and its associated oral and cardiovascular disease are already prevalent, these

Table 1. Motive endorsement by current (N=76) versus former (N=30) nicotine pouch user status in rural Appalachia, 2025–2026

Motive	Current nicotine pouch user n (%)	Former nicotine pouch user n (%)	p[a]
Convenient (smoke-free spaces)	55 (87)	24 (83)	0.54[b]
Available in flavors I like	50 (79)	22 (76)	0.71
Less harmful to others	48 (76)	16 (55)	**0.042**
Acceptable to non-users	46 (75)	17 (59)	0.10
Helps quit other products	46 (74)	12 (41)	**0.002**
No one can tell I use	44 (70)	19 (66)	0.68
Less harmful to me	42 (68)	17 (59)	0.40
Affordable	41 (65)	15 (52)	0.22
No smell	40 (63)	15 (52)	0.28
Stronger sensations	30 (48)	9 (31)	0.12
People important to me use	23 (37)	13 (45)	0.45
Advertising appeals to me	23 (37)	8 (28)	0.40
Media/public figures use	18 (29)	6 (21)	0.48

[a]Chi-squared test. [b]Fisher's exact test. Bold indicates $p<0.05$. Endorsement was coded as 'yes' versus all other responses ('no', 'don't know', 'refuse to answer'); percentages use all respondents who answered the item. N-valid for former NP use = 29, except 'Media/public figures use' = 28. N-valid for current NP use = 63, except for 'Less harmful to me', 'Helps quit other products', and 'Stronger sensations' = 62, and 'Acceptable to non-users' = 61.

beliefs warrant careful attention[3,4]. The prominence of flavor as a motive is consistent with national evidence that flavors drive NP appeal and sales, and supports ongoing regulatory discussions about flavor restrictions for oral nicotine products[8]. Two highly endorsed motives, convenience and discreet use, likely reflect the practical advantages of a spitless, odorless product that can be used where smoking, vaping, and other smokeless products cannot[13].

Across lifetime users, NP use was driven primarily by practical and product-related considerations together with harm-reduction beliefs. When we compared current and former users, harm-reduction motives were endorsed more frequently by current users, with significant differences for lower perceived harm to others and using NPs to quit other products, suggesting that NP users may be using these products to cut down or quit other tobacco and nicotine products. Results are consistent with national data showing that NP use is concentrated among adults who currently use or formerly used other nicotine products, and that daily NP use is most common among those who recently quit another product[5,22]. The use of appealing flavors also fits with this finding, as current other tobacco users could find pouches more appealing than US Food and Drug Administration (FDA)-approved nicotine replacement therapy, which has a more limited flavor profile[23]. The prominence of a 'less harmful to others' belief may reflect the discreet, smoke- and odor-free nature of pouches, which removes the secondhand exposure that accompanies smoking and vaping[24,25].

The low endorsement of social and normative motives contrasts with research among adolescents and young adults, for whom peer use, advertising, and social media exposure have been associated with initiation of NPs[10]. Our sample comprised adults in a rural setting who had used NPs, which suggests that motivations for NP use are not uniform across populations and that interventions targeting youth and young adults may not reach adult rural users. Product-related motives, which we hypothesized would differ between current and former users, were endorsed more often by current users but were not significantly different.

Limitations

This study has several limitations. First, the cross-sectional design limits causal inference about which motives sustain use over time. Additionally, no demographic data were collected to preserve anonymity and mitigate bias; however, participants were recruited from sites in predominantly White rural communities, which may limit generalizability to other NP users. Future studies should replicate our findings in a larger sample with demographic variability to identify the impact of potential confounders. Motives were assessed with investigator-developed and adapted items that have not been formally validated for NPs, and responses were self-reported without biochemical verification, potentially introducing information bias and misclassification into the results. Finally, the small former NP user group and the absence of adjustment for multiple comparisons limit the strength of the between-group comparisons, and thus interpretations warrant caution.

CONCLUSIONS

This cross-sectional study explored 13 different motivations for NP use among current and former NP users in rural Appalachia. Namely, convenience of NPs in smoke-free spaces and flavor availability were the most commonly endorsed motivators for use, while appealing advertisements and media or public figure use were the least commonly endorsed motivations. Lower perceived harm to others and use of NPs to help quit other products were more commonly endorsed as motives for NP use among current users than former users. Future longitudinal research with validated measures is needed to clarify whether NPs function as a harm-reduction or cessation tool in rural Appalachia or as a means of sustaining nicotine dependence.

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CONFLICTS OF INTEREST

The authors have each completed and submitted an ICMJE Form for Disclosure of Potential Conflicts of Interest. The authors declare that they have no competing interests, financial or otherwise, related to the current work. A. Wester reports that for the past 36 months she received funds from the Virginia Youth Tobacco Prevention program to attend their annual meeting and funding from the University of Chicago to attend the annual Society for Nicotine and Tobacco Research meeting. M. Little reports that since the initial planning of the work she received support for the present manuscript from the National Cancer Institute P30CA044579 with payments made to the University of Virginia. She also reports that for the past 36 months she has received funding from the National Cancer Institute (R01CA309123 and R01CA267963) with all payments made to the University of Virginia. Additionally she reports that she has received support for attending the American Association of Cancer Research 19th Annual Conference on Health Disparities. Furthermore she reports that she serves as Special Interest Group Chair for the Society of Behavioral Medicine and as State Lead for Eliminate Tobacco Use Virginia, uncompensated roles. D. Noonan reports that since the initial planning of the work he received support for the present manuscript under grant (R01CA242593). He also reports that since the initial planning of the work he has received honoraria from the University of West Virginia for a speaking event. Additionally he reports that he serves as an uncompensated board member for the Green Rural Redevelopment Organization, the Healthy Tomorrow Foundation, and the Rural Nurses Organization.

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ETHICAL APPROVAL AND INFORMED CONSENT

The study received a waiver of ethical approval from the coordinating academic institution's Social and Behavioral Sciences Institutional Review Board. Participants provided informed consent.

DATA AVAILABILITY

Survey data may be made available upon reasonable request to the corresponding author, consistent with IRB terms.

AUTHORS' CONTRIBUTIONS

ML, KB, DN and HS: conceptualized the study. IM: conducted formal analyses. ML, AW and SG: wrote drafts of the manuscript. All authors read and approved the final version of the manuscript.

AI DECLARATION

During the preparation of this manuscript, the authors used Claude (Anthropic) to assist with literature reviews, proofread the article for typographical, numerical, and referencing errors, edit language and grammar. The authors reviewed and verified all suggested changes, independently rechecked the statistical results, and take full responsibility for the content of the publication. No AI tools were used for study design, data collection, or data analysis.

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